# CLAIMS

1. A method for preparing a substrate having a patterned surface, comprising:

(a) providing a substrate having a surface to which molecular moieties can covalently bind;

(b) identifying predetermined regions on the substrate surface that correspond to a desired surface pattern;

(c) derivatizing the substrate surface by contacting the predetermined regions of the surface with a molecular moiety A-B, wherein A is a reactive terminus and B is an inert segment, under conditions effective to bring about covalent binding of the molecular moiety A-B to the surface through the reactive terminus A, thus providing surface-bound B segments in the predetermined regions with the remainder of the surface comprised of unmodified regions;

(d) contacting the derivatized substrate surface provided in step (c) with a molecular moiety A′-L-C, wherein A′ is a reactive terminus and may or may not be the same as A, L is a linker, and C is a molecular segment terminating in a functional group, under conditions effective to bring about covalent binding of the molecular moiety A′-L-C to the unmodified regions of the substrate surface through the reactive terminus A′, whereby a modified substrate surface is provided having surface-bound B segments in the predetermined regions and surface-bound C segments on the remainder of the surface; and

(e) contacting the modified surface provided in step (d) with a polymerizable composition under conditions effective to result in the binding of a polymer to the functional groups of the surface-bound C segments.

2. The method of claim 1, wherein the substrate is metallic.

3. The method of claim 1, wherein the substrate is comprised of a metal oxide.

4. The method of claim 1, wherein the substrate is silicon-containing.

5. The method of claim 1, wherein the substrate is polymeric.

6. The method of claim 1, wherein step (b) is conducted by stamping the substrate surface with a stamp coated with the molecular moiety A-B in a pattern that identical to the pattern defined by the predetermined regions on the substrate surface.

7. The method of claim 1, wherein the surface-bound B segments provided in step (c) comprise a self-assembled monolayer.

8. The method of claim 1, wherein the surface-bound -L-C segments provided in step (d) comprise a self-assembled monolayer.

9. The method of claim 1, wherein the polymerization composition is comprised of reactive monomers.

10. The method of claim 1, wherein the polymerization composition is comprised of an intact polymer capable of binding to the functional group of the molecular segment C.

11. The method of claim 1, wherein A is selected from the group consisting of -OH, -SH, $-NH_2$, $-CONH_2$, -COOH, $-SO_3H$, -CN, $-PO_3H$, $-SiCl_3$, $-SiR_2Cl$, -SR and -SSR wherein R is alkyl or aryl.

12. The method of claim 1, wherein A′ is selected from the group consisting of -OH, -SH, $-NH_2$, $-CONH_2$, -COOH, $-SO_3H$, -CN -OH, -SH, $-NH_2$, $-PO_3H$, $-SiCl_3$, $-SiR_2Cl$, -SR and -SSR wherein R is alkyl or aryl.

13. The method of claim 1, wherein B is hydrocarbyl of 1 to 20 carbon atoms containing 0 to 6 ether linkages.

14. The method of claim 13, wherein B is saturated alkyl containing 1 to 15 carbon atoms and 0 to 4 ether linkages.

15. The method of claim 1, wherein L is hydrocarbylene of 1 to 20 carbon atoms containing 0 to 6 ether linkages.

16. The method of claim 15, wherein L is saturated alkylene containing 1 to 15 carbon atoms and 0 to 4 ether linkages.

17. The method of claim 1, wherein C is selected from the group consisting of -OH, $-NH_2$, -COOH, $-SO_3H$, -CN, alkoxyamine, azo, peroxide, halide and sulfonyl halide.

18. A method for etching a substrate surface, comprising:

(a) identifying predetermined regions on the surface to be protected from etching;

(b) contacting the predetermined regions with a molecular moiety A′-L-C, wherein A′ is a reactive terminus, L is a linker, and C is a molecular segment terminating in a functional group, under conditions effective to bring about covalent binding of the molecular moiety A′-L-C to the surface through the reactive terminus A′, thus providing surface-bound -L-C segments in the predetermined regions with the remainder of the surface comprised of unmodified, exposed regions; and

(d) contacting the surface derivatized in step (b) with a polymerizable composition under conditions effective to result in the binding of a polymer to the functional groups of the surface-bound C segments; and

(d) contacting the surface modified in step (c) with a reagent that is selected to degrade the unmodified, exposed regions of the surface but that is inert with respect to the surface-bound polymer.

19. The method of claim 18, further including, after step (e), removing the surface-bound -L-C groups and the polymer to uncover the predetermined regions of the surface.

20. The method of claim 18, wherein the surface-bound -L-C segments provided in step (c) comprise a self-assembled monolayer.

21. The method of claim 18, wherein the polymerization composition is comprised of reactive monomers.

22. The method of claim 18, wherein the polymerization composition is comprised of an intact polymer capable of covalent attachment to the functional group of the molecular segment C.

23. The method of claim 18, wherein the surface is electrically conductive.

24. A substrate having a patterned surface, comprising:

(a) a substrate having a surface with predetermined regions that correspond to a

desired surface pattern and remaining regions that correspond to the inverse of the desired surface pattern;

(b) a first self-assembled monolayer of a first molecular moiety covalently bound to the surface within the predetermined regions; and

(c) a polymeric overlayer comprised of a polymer bound to the first molecular moiety.

25. The substrate of claim 24, further comprising: (d) a second self-assembled monolayer of a second molecular moiety bound to the surface in the remaining regions.

26. The substrate of claim 24, wherein the substrate surface is metallic.

27. The substrate of claim 24, wherein the substrate surface is comprised of a metal oxide.

28. The substrate of claim 24, wherein the substrate surface is silicon-containing.

29. The substrate of claim 24, wherein the substrate surface is polymeric.